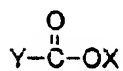
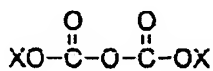


In the Claims

1. (Currently Amended) A process for producing an oxycarbonyl-substituted piperazine derivative, in which a piperazine derivative represented by general formula (1) is oxycarbonylated in the presence of a reagent represented by general formula (3) or general formula (4)

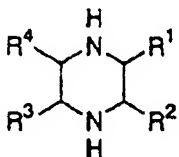


(3)

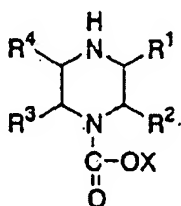


(4)

(where X denotes i) an alkyl group with 1 to 4 carbon atoms, ii) an alkenyl group with 2 to 4 carbon atoms, iii) an alkynyl group with 2 to 4 carbon atoms, iv) an aralkyl group not substituted in the aromatic ring, or substituted by an alkyl group with 1 to 4 carbon atoms or by an alkoxy group with 1 to 4 carbon atoms or by a halogen group, or v) an aryl group not substituted in the aromatic ring, or substituted by an alkyl group with 1 to 4 carbon atoms or by an alkoxy group with 1 to 4 carbon atoms or by a halogen group and Y denotes a chlorine atom) and an organic solvent with a water content of 15 wt% or less to produce an oxycarbonyl-substituted piperazine derivative represented by general formula (2)



(1)



(2)

(where R¹, R², R³ and R⁴ denote, respectively independently, i) a hydrogen atom, ii) an alkyl group with 1 to 4 carbon atoms, iii) an alkoxy group with 1 to 4 carbon atoms, iv) a halogen group, v) a carboxyl group, ~~vi) a carbamoyl group, or vii) an N-alkylcarbamoyl group with 1 to 4 carbon atoms in its alkyl group~~; X denotes i) an alkyl group with 1 to 4 carbon atoms, ii) an alkenyl group with 2 to 4 carbon atoms, iii) an alkynyl group with 2 to 4 carbon atoms, iv) an aralkyl group not substituted in the aromatic ring, or substituted by an alkyl group with 1 to 4 carbon atoms or by an alkoxy group with 1 to 4 carbon atoms or by a halogen group, or v) an aryl group not substituted in the aromatic ring, or substituted by an alkyl group with 1 to 4 carbon atoms or by an alkoxy group with 1 to 4 carbon atoms or by a halogen group; excluding the case where all of R¹, R², R³ and R⁴ denote a

hydrogen atom respectively), characterized in that an organic solvent with a water content of 15 wt% or less is used.

2. (Cancelled)

3. (Currently Amended) A The process for producing an oxycarbonyl-substituted piperazine derivative, according to claim 1 or 2, wherein the X in the general formula (2) denotes a tert-butyl group or benzyl group.

4. (Currently Amended) A The process for producing an oxycarbonyl-substituted piperazine derivative, according to claim 2 1, wherein the reagent represented by the general formula (3) or the general formula (4) is benzyl chlorocarbonate or di-tert-butyl dicarbonate.

5. (Currently Amended) A The process for producing an oxycarbonyl-substituted piperazine derivative, according to claim 1, wherein the organic solvent is an alcohol.

6. (Currently Amended) A The process for producing an oxycarbonyl-substituted piperazine derivative, according to claim 1, wherein the R¹ in the general formula (1) and the general formula (2) denotes a methyl group, and R², R³ and R⁴ denote a hydrogen atom respectively.

7. (Currently Amended) A The process for producing an oxycarbonyl-substituted piperazine derivative, according to claim 1, wherein the compounds represented by the general formula (1) and the general formula (2) are optically active substances.

8. (Currently Amended) A The process for producing an oxycarbonyl-substituted piperazine derivative, according to claim 1, wherein a nitrogen-containing aromatic compound coexists as an additive when in oxycarbonylating the piperazine derivative represented by the general formula (1) is oxycarbonylated, a nitrogen-containing aromatic compound is made to coexist.

9. (Currently Amended) A The process for producing an oxycarbonyl-substituted piperazine derivative, according to claim 8, wherein the pKa of the nitrogen-containing aromatic compound is 7 or less.

10. (Currently Amended) A The process for producing an oxycarbonyl-substituted piperazine derivative, according to claim 9, wherein the nitrogen-containing aromatic compound is pyridine or a pyridine derivative.

11. (Currently Amended) A The process for producing an optically active oxycarbonyl-substituted piperazine derivative, according to claim 7, wherein the diastereomer salts of an optically active piperazine derivative and an optically active resolving agent, obtained by optical resolution

using the optically active resolving agent, or the optically active piperazine derivative obtained by decomposing the salts is used as ~~the~~ a raw material.

12. (Currently Amended) A ~~The process for producing an optically active oxycarbonyl-substituted piperazine derivative~~, according to claim 11, wherein a the optically active piperazine derivative obtained by optically resolving a optical resolution with a solvent which is 0.5 to 4.0 times as heavy as a racemic piperazine derivative provided as a racemic modification in the presence of a lower carboxylic acid or mineral acid ~~using 0.5 to 4.0 times by weight, based on the amount of the piperazine derivative, of a solvent~~, is used as the raw material.

13. (Currently Amended) A ~~The process for producing an optically active oxycarbonyl-substituted piperazine derivative~~, according to claim 11 or 12, wherein the optically active resolving agent is optically active tartaric acid.

14. (Currently Amended) A ~~The process for producing an optically active oxycarbonyl-substituted piperazine derivative~~, according to claim 12, wherein the lower carboxylic acid or mineral acid is at least one selected from acetic acid, propionic acid, hydrochloric acid and sulfuric acid.

15. (Currently Amended) A ~~The process for producing an optically active oxycarbonyl-substituted piperazine derivative~~, according to claim 12, wherein the solvent used for performing optical resolution is water or a hydrous alcohol.

16. (Currently Amended) A ~~The process for producing an optically active oxycarbonyl-substituted piperazine derivative~~, according to claim 11, wherein when the water soluble diastereomer salts obtained by optical resolution from an optically active piperazine derivative and optically active tartaric acid are decomposed, a salt of an alkaline earth metal is used in a solvent containing 50 wt% or more of water.

17. (Currently Amended) A ~~The process for producing an optically active oxycarbonyl-substituted piperazine derivative~~, according to claim 16, wherein the salt of an alkaline earth metal is any one of hydroxides, halides, sulfates and carbonates.

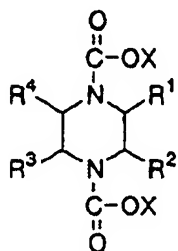
18. (Currently Amended) A ~~The process for producing an optically active oxycarbonyl-substituted piperazine derivative~~, according to claim 17, wherein the hydroxide of an alkaline earth metal is any one of magnesium hydroxide, calcium hydroxide, strontium hydroxide and barium hydroxide.

19. (Currently Amended) A ~~The process for producing a highly pure oxycarbonyl-substituted piperazine derivative, characterized in that according to claim 1, wherein the oxycarbonyl-substituted piperazine derivative obtained in claim 1~~ is refined by

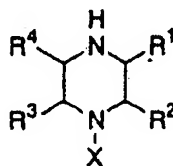
- (1) a step of washing using an organic solvent ~~of 10 wt% or less in the~~ whose mutual solubility with water at 20°C is 10 wt% or less in a water solvent ~~of whose pH is 3 or less, and/or~~
- (2) a distillation step.

20. (Currently Amended) A ~~The process for producing a highly pure oxycarbonyl-substituted piperazine derivative, according to claim 19, wherein the organic solvent of 10 wt% or less in the~~ whose mutual solubility with water at 20°C is 10 wt% or less is an aromatic hydrocarbon.

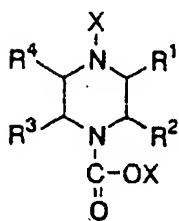
21. (Currently Amended) ~~A highly pure~~ An oxycarbonyl-substituted piperazine derivative composition, ~~characterized in that~~ wherein the total of the contents of the impurities represented by the following general formulae (5) to (8):



(5)



(6)



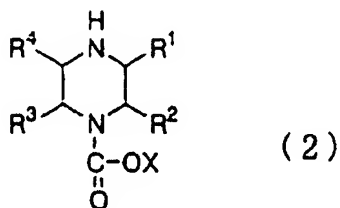
(7)

XOH

(8)

(where R¹, R², R³ and R⁴ denote, respectively independently, i) a hydrogen atom, ii) an alkyl group with 1 to 4 carbon atoms, iii) an alkoxy group with 1 to 4 carbon atoms, iv) a halogen group, v) a carboxyl group, ~~vi) a carbamoyl group, or vii) an N-alkylcarbamoyl group with 1 to 4 carbon atoms in its alkyl group~~, X denotes i) an alkyl group with 1 to 4 carbon atoms, ii) an alkenyl group with 2 to 4 carbon atoms, iii) an alkynyl group with 2 to 4 carbon atoms, iv) an aralkyl group not substituted in the aromatic ring, or substituted by an alkyl group with 1 to 4 carbon atoms or by an alkoxy group with 1 to 4 carbon atoms or by a halogen group, or v) an aryl group not substituted in the aromatic

ring, or substituted by an alkyl group with 1 to 4 carbon atoms or by an alkoxy group with 1 to 4 carbon atoms or by a halogen group; excluding the case where all of R¹, R², R³ and R⁴ denote a hydrogen atom respectively) contained in a composition containing the oxycarbonyl-substituted piperazine derivative represented by general formula (2):



(where R¹, R², R³ and R⁴ denote, respectively independently, i) a hydrogen atom, ii) an alkyl group with 1 to 4 carbon atoms, iii) an alkoxy group with 1 to 4 carbon atoms, iv) a halogen group, v) a carboxyl group, vi) a carbamoyl group, or vii) an N-alkylcarbamoyl group with 1 to 4 carbon atoms in its alkyl group; X denotes i) an alkyl group with 1 to 4 carbon atoms, ii) an alkenyl group with 2 to 4 carbon atoms, iii) an alkynyl group with 2 to 4 carbon atoms, iv) an aralkyl group not substituted in the aromatic ring, or substituted by an alkyl group with 1 to 4 carbon atoms or by an alkoxy group with 1 to 4 carbon atoms or by a halogen group, or v) an aryl group not substituted in the aromatic ring, or substituted by an alkyl group with 1 to 4 carbon atoms or by an alkoxy group with 1 to 4 carbon atoms or by a halogen group; excluding the case where all of R¹, R², R³ and R⁴ denote a hydrogen atom respectively), is 2% by HPLC liquid chromatography area [[%]] or less based on the total of the content of the oxycarbonyl-substituted piperazine derivative represented by the general formula (2) and the contents of the impurities.

22. (Currently Amended) ~~A highly pure oxycarbonyl-substituted piperazine derivative~~
The composition, according to claim 21, wherein every R¹ in the general formulae (2) and (5) to (8) denotes a methyl group and every R² to R⁴ denote a hydrogen atom respectively.

23. (Currently Amended) ~~A highly pure oxycarbonyl-substituted piperazine derivative~~
The composition, according to claim 21, wherein X in the general formulae (2) and (5) to (8) denotes any one of a tert-butyl group, phenyl group and benzyl group.

24. (Currently Amended) ~~A highly pure oxycarbonyl-substituted piperazine derivative~~
The composition, according to claim 21, wherein the piperazine derivative represented by the general

formula (2) is an optically active substance in which the carbon atom having R^1 attached is an asymmetric carbon atom.